

## CLAIMS

We claim:

5           1.     A method for balancing upstream traffic of a subscriber device in a broadband communication network over a plurality of upstream channels, comprising:

              performing static load balancing when the subscriber device requests an upstream channel; and

10           performing predictive load balancing between upstream channels based on the number of subscriber devices configured with a media terminal adaptor such that the upstream channel assignment of user devices having an MTA is spread across the upstream channels.

15           2.     The method of claim 1 wherein the step of static load balancing includes:

              assigning a requesting subscriber device to a requested channel if the cumulative upstream bandwidth demand of the subscriber devices currently assigned thereto is below a first predetermined CAC threshold level;

20           assigning a requesting subscriber device to the requested channel if the cumulative upstream bandwidth demand of the subscriber devices currently assigned thereto is below a second predetermined CAC threshold level, and none of the upstream channels have a cumulative upstream bandwidth demand below the first predetermined threshold; and

25           assigning the requesting subscriber device to the upstream channel having the lowest bandwidth demand if none of the plurality of upstream

channels has a bandwidth demand below the first or second predetermined threshold levels.

3. The method of claim 1 wherein an upstream channel override  
5 change message is sent to the requesting device to cause said device to be assigned to a channel other than the channel being requested.

4. The method of claim 2 wherein a subscriber device will not be  
assigned to a given channel if an attempt to communicate using said channel  
10 has failed.

5. The method of claim 1 wherein the subscriber device is a cable  
modem.

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6. A method for performing static load balancing of one of a plurality of subscriber devices in a broadband communication network over a plurality of upstream channels, comprising:

5 assigning the one subscriber device to an upstream channel based on the number of subscriber devices assigned to communicate over each of the upstream channels wherein the cumulative bandwidth of the subscriber devices assigned to a channel is compared to a predetermined CAC threshold level for said channel.

10 7. The method of claim 6 further comprising:

assigning a requesting subscriber device to a requested channel if the cumulative upstream bandwidth demand of the subscriber devices currently assigned thereto is below a first predetermined CAC threshold level;

15 assigning a requesting subscriber device to the requested channel if the cumulative upstream bandwidth demand of the subscriber devices currently assigned thereto is below a second predetermined CAC threshold level, and none of the upstream channels have a cumulative upstream bandwidth demand below the first predetermined threshold; and

20 assigning the requesting subscriber device to the upstream channel having the lowest bandwidth demand if none of the plurality of upstream channels has a bandwidth demand below the first or second predetermined threshold levels.

8. The method of claim 6 wherein an upstream channel override change message is sent to the requesting device to cause said device to be assigned to a channel other than the channel being requested.

9. The method of claim 7 wherein a subscriber device will not be assigned to a given channel if an attempt to communicate using said channel has failed.

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10. The method of claim 6 wherein the subscriber device is a cable modem.

11. A method for performing predictive load balancing of upstream traffic of one of a plurality of subscriber devices in a broadband communication over a plurality of upstream channels, comprising:

5 determining whether the subscriber device uses a media terminal adaptor and has predictive load balancing enabled;

determining which of the plurality of upstream channels has the least number of subscriber devices using an MTA assigned thereto; and

changing the assigned upstream channel for the one subscriber device if the upstream channel to which it is currently assigned is not the upstream  
10 channel having the least number of subscriber devices using an MTA assigned thereto.

12. The method of claim 11 wherein a dynamic channel change request message is used to effect a change from the currently assigned  
15 channel to the channel having the least number of MTA devices assigned thereto.

13. The method of claim 11 wherein the subscriber device is a cable modem.

14. A method for performing predictive load balancing of upstream traffic of one of a plurality of subscriber devices in a broadband communication over a plurality of upstream channels wherein a DSA\_use\_history profile is used to assign the subscriber to an upstream  
5 chanel.

15. The method of claim 14, wherein the DSA\_use\_history profile is used to predict the best channel to which the subscriber device should be assigned, including the steps of:

10 determining whether the subscriber device has a DSA\_use\_history profile associated therewith;

determining whether the currently assigned upstream channel is the channel from among the plurality of upstream channels having the least number of subscriber devices assigned thereto that match this subscriber's  
15 DSA\_use\_history profile; and

changing the upstream channel if the currently assigned channel is not the channel having the least number of subscriber devices assigned thereto that match this subscriber's DSA\_use\_history profile.

20 16. The method of claim 14 wherein a dynamic channel change request message is used to effect a channel change.

17. The method of claim 14 wherein the DSA\_use\_history profile is used to assign a subscriber device to a channel based on the time of day  
25 the balancing operation is occurring.

18. The method of claim 14 wherein the DSA\_use\_history profile is used to assign a subscriber device to a channel based on the day of the week the balancing operation is occurring.